

We claim:

- 1.) A method of identifying a set of routes for a net having a set of pins in a region of a design layout, the method comprising:
 - a) partitioning the region into a plurality of sub-regions,
 - b) identifying a first set of sub-regions containing the net's pins;
- c) determining whether a storage structure stores a set of routes for the identified first set of sub-regions;
- d) if the storage structure stores a set of routes for the identified first set of sub-regions, retrieving the set of routes;
- e) if the storage structure does not store a set of routes for the identified first set of sub-regions, generating a set of routes.
 - 2. The method of claim 1, wherein generating the set of routes comprises:
- a) identifying a connection set of sub-regions that when combined

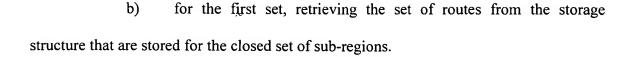
 with the first set forms a closed set of sub-regions that does not have any sub-region that

 is not adjacent to another sub-region in the closed set, wherein the storage structure stores

 a set of routes for the closed set, and

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- 3. The method of claim 2, wherein the closed set can be traversed by a minimum tree route that connects each sub-region in the connection set to at least two other sub-regions in the primary and connection sets of sub-regions.
- 4. The method of claim 2, wherein the storage structure stores the set of routes for the identified first set of sub-regions when the first set of sub-regions is a closed set that has each of its sub-regions adjacent to another sub-region in the set.
- 5. The method of claim 2, wherein a plurality of paths exist between the subregions defined by the set of partitioning lines, wherein routes are defined with respect to the paths.
- 6. The method of claim 5, wherein a plurality of the paths are diagonal paths, wherein some routes traverse some of the diagonal paths.
- 7. The method of claim 2, wherein a plurality of edges exist between the subregions defined by the set of partitioning lines, wherein routes are defined with respect to the paths.
- 8. The method of claim 7, wherein a plurality of the edges between the subregions are diagonal edges, wherein some routes intersect some of the diagonal edges.
 - 9. A method of identifying routes for nets in a region of a design layout,

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- a) partitioning the region into a plurality of sub-regions,
- b) for each of a plurality of nets,

identifying a first set of sub-regions containing the net's pins;

determining whether a storage structure stores a set of routes for the identified first set of sub-regions;

if the storage structure stores a set of routes for the identified first set of sub-regions, retrieving the set of routes;

if the storage structure does not store a set of routes for the identified first set of sub-regions, generating a set of routes.

- 10. The method of claim 9, wherein generating the routes for a net comprises:
- a) identifying a connection set of sub-regions that when combined with the first set for the net forms a closed set of sub-regions that does not have any sub-region that is not adjacent to another sub-region in the closed set, wherein the storage structure stores a set of routes for the closed set, and
- b) for the first set, retrieving the set of routes from the storage structure that are stored for the closed set of sub-regions.

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- 11. The method of claim 10, wherein the closed set can be traversed by a minimum tree route that connects each sub-region in the connection set to at least two other sub-regions in the primary and connection sets of sub-regions.
- 12. The method of claim 10, wherein the storage structure stores the set of routes for the identified first set of sub-regions when the first set of sub-regions is a closed set that has each of its sub-regions adjacent to another sub-region in the set.

A computer readable medium that includes a computer program for identifying a route for a net in a region of a design layout, the computer program comprising:

- a) a first set of instructions for partitioning the region into a plurality of sub-regions,
- b) a second set of instructions for identifying a first set of sub-regions containing the net's pins;
- c) a third set of instructions for determining whether a storage structure stores a set of routes for the identified first set of sub-regions;
- d) a fourth set of instructions for retrieving a set of routes if the storage structure stores the set of routes for the identified first set of sub-regions;

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e) a fourth set of instructions for generating a set of routes, if the storage structure does not store the set of routes for the identified first set of sub-regions.

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- 14. The computer readable medium of claim 13, wherein the fourth set of instructions comprises:
- a) fifth set of instruction for identifying a connection set of sub-regions that when combined with the first set forms a closed set of sub-regions that does not have any sub-region that is not adjacent to another sub-region in the closed set, wherein the storage structure stores a set of routes for the closed set, and
- b) a sixth set of instructions for retrieving, for the first set, the set of routes from the storage structure that are stored for the closed set of sub-regions.
- 15. The computer readable medium of claim 13, wherein the closed set can be traversed by a minimum tree route that connects each sub-region in the connection set to at least two other sub-regions in the primary and connection sets of sub-regions.
- 16. The computer readable medium of claim 13, wherein the storage structure stores the set of routes for the identified first set of sub-regions when the first set of sub-regions is a closed set that has each of its sub-regions adjacent to another sub-region in the set.
- 17. The computer readable medium of claim 13, wherein a plurality of paths exist between the sub-regions defined by the set of partitioning lines, wherein routes are defined with respect to the paths.
- 18. The computer readable medium of claim 17, wherein a plurality of the paths are diagonal paths, wherein some routes traverse some of the diagonal paths.

- 19. The computer readable medium of claim 13, wherein a plurality of edges exist between the sub-regions defined by the set of partitioning lines, wherein routes are defined with respect to the paths.
- The computer readable medium of claim 19, wherein a plurality of the
 edges between the sub-regions are diagonal edges, wherein some routes intersect some of the diagonal edges.